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# मानक

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IS 6865 (1973): Pallets for Use in ISO Series 1 Freight Containers [TED 12: Freight Containers and Pallets]



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*Indian Standard*  
SPECIFICATION FOR  
PALLETS FOR USE IN ISO SERIES 1  
FREIGHT CONTAINERS

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BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# Indian Standard

## SPECIFICATION FOR PALLETES FOR USE IN ISO SERIES 1 FREIGHT CONTAINERS

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*Indian Standard*  
SPECIFICATION FOR  
PALLETS FOR USE IN ISO SERIES 1  
FREIGHT CONTAINERS

**0. FOREWORD**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 16 February 1973, after the draft finalized by the Pallets Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

**0.2** This standard has been prepared to help unit-load system of materials handling in ISO freight containers with fork lift trucks, pallet trucks or other handling devices, using pallets of standard dimensions of quality.

**0.3** Unit load is the most convenient and normal method of handling, warehousing and shipping goods. For use in freight containers the unit loads shall be sized to fit the internal dimensions of the containers.

**0.3.1** A standardized unit load shall have specific dimensional tolerance so as to prevent inadvertent oversizing or undersizing. Oversizing may cause jamming of the load against the container walls. Undersizing may result in wastage of cargo space and perhaps make the load slack and thus susceptible to transit damage.

**0.3.2** Determining tolerance for unit loads is a complex matter since load dimensions tend to change in the process of filling, storage, handling and transport. Various factors, such as load bulge and stacking irregularity may cause such dimensional variations.

**0.3.3** Load bulge may include filling bulge, compression bulge and settling bulge. Stacking irregularity may be caused by unitizing inefficiency, out-of-plumb stacking and out-of-square stacking.

**0.3.4** All these factors tending to change the basic dimensions of the unit load may not be eliminated nor it is necessary or desirable to eliminate all. But they shall be controlled by providing a dimensionally standardized unit load with a tolerance.

**0.3.5** In order to simplify the problem of expressing the unit-load dimensional tolerance, the concept of 'Plan-View Size' ( PVS ) is adopted. PVS specifies the maximum allowable dimensions of the unit load in the dynamic or static state whichever is larger.

**0.3.6** In addition, the concept of 'Net Unit-Load Size' (NULS) is used to express the basic dimensions of the unit load excluding all allowances for dimensional variations. The 'Net Unit-Load Size' is obtained by subtracting from the 'Plan-View Size' (PVS) the allowable tolerance.

**0.3.7** The pallet dimensions specified in this standard are the 'Net Unit-Load Sizes' (NULS).

**0.3.8** The ideal sizes of unit loads are those that shall give optimum cargo space utilization in shipping containers and airfreighters, as well as lend themselves suitable for movement by rail and road transport.

**0.4** In the preparation of this standard considerable assistance has been derived from the following:

Doc : ISO/TC 104 (122/SC 1 N94) 328 — First draft proposal 'Dimensions of rigid rectangular filled transport packages for conveyance by series 1 freight containers', issued by the International Organization for Standardization (ISO).

Specifications on pallets, prepared by Robot Systems Pvt Ltd, Calcutta.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

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## **1. SCOPE**

**1.1** This standard deals with dimensions, ratings and operating requirements of pallets for use in ISO series 1 freight containers.

## **2. TERMINOLOGY**

**2.1** For the purpose of this standard some of the relevant terms and definitions given in IS : 3971-1967† are reproduced below.

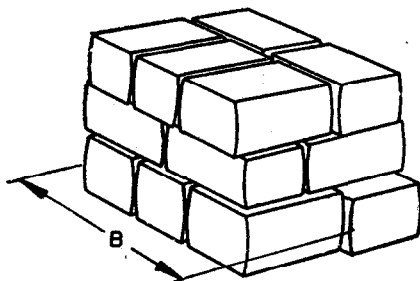
**2.1.1 Plan-View Size (PVS)** — The rectangular area defined by the lines of intersection of the floor by four vertical planes which totally enclose all extremities of the unit load when at rest in storage or shipment position (see Fig. 1).

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\*Rules for rounding off numerical values (*revised*).

†Glossary of terms on pallets.





$B$  = Plan-View Size ( PVS ).

Includes Net Unit-Load Size plus allowances for:

- a) Stacking irregularity,
- b) Compression bulge, and
- c) Settling bulge.

FIG. 1 PLAN-VIEW SIZE

**2.1.1.1** It is a dimension that may not be exceeded and, therefore, has no plus tolerance so as to prevent any chance of the load jamming against the walls of the container or the transport vehicle, while not wasting cargo space.

**2.1.1.2** Transport vehicles cargo space utilization is calculated with PVS dimensions.

**2.1.2 Net Unit-Load Size ( NULS )** — The rectangular area defined by the basic dimensions of the unit load excluding all allowances for dimensional variations ( see Fig. 2 ).

**2.1.2.1** NULS is obtained from plan-view size after subtracting allowances for load stacking irregularity, compression bulge and settling bulge. The aggregate of these allowances is approximately 4 percent of NULS when applied equally to the length and width dimensions of the unit load that is  $\frac{PVS}{1.04} \approx NULS$

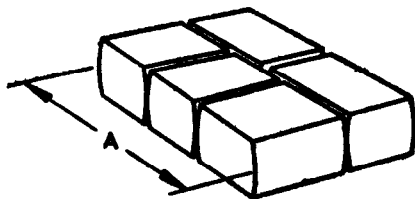
*Example:*

$$\frac{1\,372 \times 1\,143}{1.04} \approx 1\,320 \times 1\,100$$

where

1 372 × 1 143 mm is PVS, and

1 320 × 1 100 mm is NULS.



**A = Net Unit-Load Size.,**

**Includes only the dimensions of the filled transport-packages.**

**FIG. 2 NET UNIT-LOAD SIZE**

**2.1.3 Pay Load** — The maximum weight of goods a pallet is designed to carry individually in the course of handling.

**2.1.4 Unit Load** — The sum of the pay load and the tare of the pallet.

**2.1.5 Entry** — Space provided for the insertion of forks or other handling devices.

**2.1.6 Two-Way Entry** — Pallets which provide entry on two opposite sides only.

**2.1.7 Four-Way Entry** — Pallets which provide entry on all four sides.

**2.1.8 Length and Width** — Length of the pallet is the dimension of the deck measured along the stringers, stringerboards or forks. In case of reversible pallets, with stringerboards in cross directions, the shorter dimension shall be taken as length. The other dimension of the deck shall be the width. The length shall always be designated first before width (see Fig. 1 and 2).

### **3. DIMENSIONS**

**3.1 Overall Dimensions** — The dimensions (NULS) of pallets and their corresponding (PVS) are given in Table 1.

NOTE 1 — Appendix A gives the internal dimensions and ratings of ISO series 1 freight containers. The 1143 mm (PVS) width of the unit load shall always fit the internal width of the ISO series 1 freight containers. Unit loads of 1039 × 1247 mm (PVS) shall fit in when placed in pin wheel method.

NOTE 2 — Appendix B gives the cargo space utilization in the ISO series 1 freight containers with the use of pallets listed in Table 1.

### **4. RATINGS**

**4.1** The nominal load ratings of the pallet shall be its 'unit load' and shall be expressed in kg.

TABLE 1 OVERALL DIMENSIONS OF PALLETS

DIMENSIONS OF PALLETS IN mm (NET UNIT-LOAD SIZES, NULS)	( Clause 3.1 ) MANUFACTURING TOLERANCE, mm	PLAN-VIEW SIZES (PVS) IN mm
		Length × Width
Length × Width		
825 × 1 100	± 5	857 × 1 143
1 000 × 1 200		1 039 × 1 247
1 100 × 1 100		1 143 × 1 143
1 320 × 1 100		1 372 × 1 143

**4.1.1** The maximum permissible unit load shall be such that the product of the unit load and the total number of pallets accommodated in a freight container does not exceed the pay load of the container.

NOTE 1 — Appendix A gives the payload ratings of ISO series 1 freight containers.

NOTE 2 — Appendix B gives the maximum permissible floor loadings in ISO series 1 freight containers for the various plan-view sizes listed in Table 1. In calculating these weights the container tare weights have been assumed as 4 064 kg for Type 1A, 3 048 kg for Type 1B and 2 032 kg for Type 1C ISO series freight containers. The maximum floor loading shall differ if container tare weights differ from these figures. The maximum permissible unit load of the pallet may be obtained by dividing the floor loading capacity per PVS by the number of tiers pallet loads are stacked.

## 5. GENERAL REQUIREMENTS

**5.1 Material, Construction and Dimensions** — The material, construction and dimensions other than those specified in this standard of the pallet shall be in accordance with 'Indian Standard specification for non-expendable timber pallets' (*under preparation*); 'Indian Standard specification for expendable timber pallets: Part I For handling tea-chests' (*under preparation*); 'Indian Standard specification for honeycomb expendable pallets' (*under preparation*); and 'Indian Standard specification for metal pallets' (*under preparation*).

**5.2 Entry** — Pallet size 1 000 × 1 200 mm shall have four-way entry. Pallets of the other sizes may have either two-way or four-way entry. Pallets used in freight containers having doors on the sides also shall have four-way entry, to enable loading and unloading both through side doors and end doors.

**5.3 Bearing Surface** — The area of the bottom bearing surface of the pallet shall be sufficient to ensure that the permissible loading specified in IS : 6566-1972\*, for the container floor is not exceeded.

\*Dimensions and ratings of ISO series 1 freight containers.

## 7. TESTING

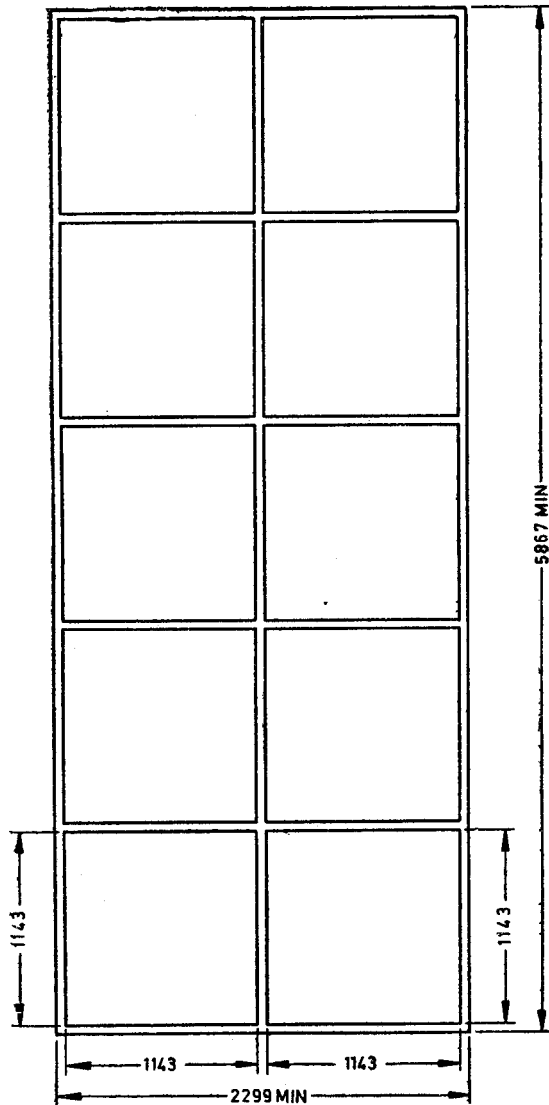
## 8. DESIGNATION

a) Length $\times$ Width	1 000 $\times$ 1 200 mm
b) Rated load capacity (R)	1 500 kg
c) IS : 6865-1973	

**9.1** Pallets shall be legibly and indelibly marked by suitable means, with the rated load, manufacturer's name or registered trade-mark, month and year of manufacture.

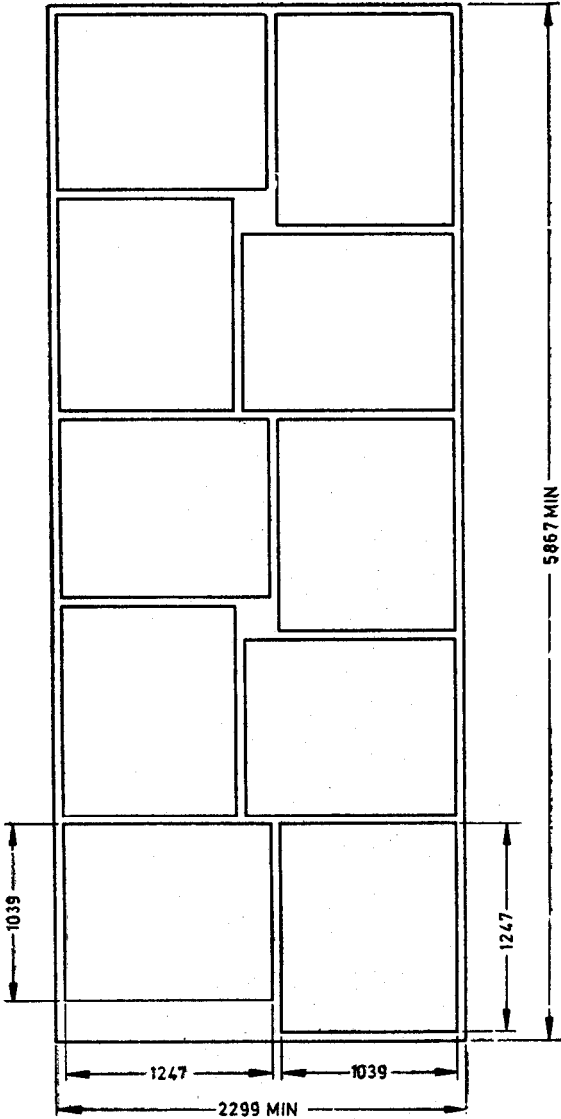
NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1936 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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All dimensions in millimetres.

FIG. 3 DISPOSITION OF 1143×1143 mm PALLETS IN ISO SERIES 1C FREIGHT CONTAINER



All dimensions in millimetres.

FIG. 4 DISPOSITION OF 1039×1247 mm PALLETS IN ISO  
SERIES 1C FREIGHT CONTAINER

# APPENDIX A

( *Clauses 3.1 and 4.1.1* )

## INTERNAL DIMENSIONS OF ISO SERIES 1 FREIGHT CONTAINERS

### A-1. DIMENSIONS

**A-1.1** The pallet sizes ( PVS ) are calculated from the internal dimensions of ISO series 1 freight containers which are given in Table 2. The values in Tables 2 and 3 are reproduced from IS : 6566-1972\*.

**TABLE 2 MINIMUM INTERNAL DIMENSIONS OF GENERAL PURPOSE  
ISO SERIES 1 FREIGHT CONTAINERS**

All dimensions in millimetres.

ISO FREIGHT CONTAINER DESIGNATION	HEIGHT, <i>Min</i>	WIDTH, <i>Min</i>	LENGTH, <i>Min</i>	RATING kg
1A	2 197	2 299	11 998	30 480
1AA	2 350	2 299	11 998	30 480
1B	2 197	2 299	8 931	25 400
1C	2 197	2 299	5 867	20 320

**TABLE 3 DOOR OPENINGS OF ISO SERIES 1 FREIGHT CONTAINERS**

All dimensions in millimetres.

ISO FREIGHT CONTAINER DESIGNATION	HEIGHT, <i>Min</i>	WIDTH, <i>Min</i>
1AA	2 286	2 286
1A, 1B and 1C	2 134	2 286

\*Dimensions and ratings of ISO series 1 freight containers.

## APPENDIX B

( *Clauses 3.1 and 4.1.1* )

### CARGO SPACE UTILIZATION OF PALLETS IN GENERAL PURPOSE ISO SERIES 1 FREIGHT CONTAINERS

#### B-1. CARGO SPACE UTILIZATION OF PALLETS

**B-1.1** For the pallet sizes (PVS) listed in Table 1, the number which shall be accommodated in ISO series 1 freight containers designated 1A, 1B and 1C are listed in Table 4. Table 4 gives the inside length of the container, percentage space utilization, number of unit loads stacked on one-high basis, unused inside length and maximum permissible floor loading per plan area of pallet.

**TABLE 4 CARGO SPACE UTILIZATION OF THE PALLETS IN GENERAL PURPOSE ISO  
SERIES 1 FREIGHT CONTAINERS 1A, 1B AND 1C**

PLAN-VIEW SIZE ( PVS ) OF PALLETS		1 372 × 1 143 mm	1 143 × 1 143 mm	857 × 1 143 mm	1 039 × 1 247 mm
ISO Freight Container	Inside Length 'l'				
(1)	(2)	(3)	(4)	(5)	(6)
1A	11 998 mm	89.5 percent, 16, 1 022 mm, 1 651 kg	93.2 percent, 20, 568 mm, 1 321 kg	97.8 percent, 28, 0 mm, 943 kg	93.9 percent, 20, 756 mm, 1 321 kg
1B	8 931 mm	90.1 percent, 14, 699 mm, 1 862 kg	87.7 percent, 12, 930 mm, 1 597 kg	93.9 percent, 20, 361 mm, 1 118 kg	88.4 percent, 14, 1 034 mm, 1 597 kg
1C	5 867 mm	91.5 percent, 8, 379 mm, 2 287 kg	95.3 percent, 10, 152 mm, 1 829 kg	85.8 percent, 12, 725 mm, 1 524 kg	96 percent, 10, 256 mm, 1 829 kg

NOTE 1 — Minimum 'l' as per IS : 6566-1972 'Dimensions and ratings of ISO series 1 freight containers'. But most modern freight containers shall provide 38 to 50 mm greater inside length ( similarly the width ).

NOTE 2 — It should be noted that because the inside length of one 12 000 mm ( 1A ) freight containers is 264 mm longer than the total inside length of two 1C freight containers ( and so forth ), some hand loading of the end of the freight containers shall always be required where using unit loads. Therefore, filling the width exactly is more important. Because of materials handling clearances, cargo space utilization may never exceed 97.8 percent.

NOTE 3 — In actual practice, a clearance shall exist ( see Note 1 ).

NOTE 4 — In col 3 to 6 the first figure is percentage space utilization; the second figure is number of unit loads stacked on one-high basis; second row shows the unused inside length and typical maximum permissible floor loading per plan area of pallet.